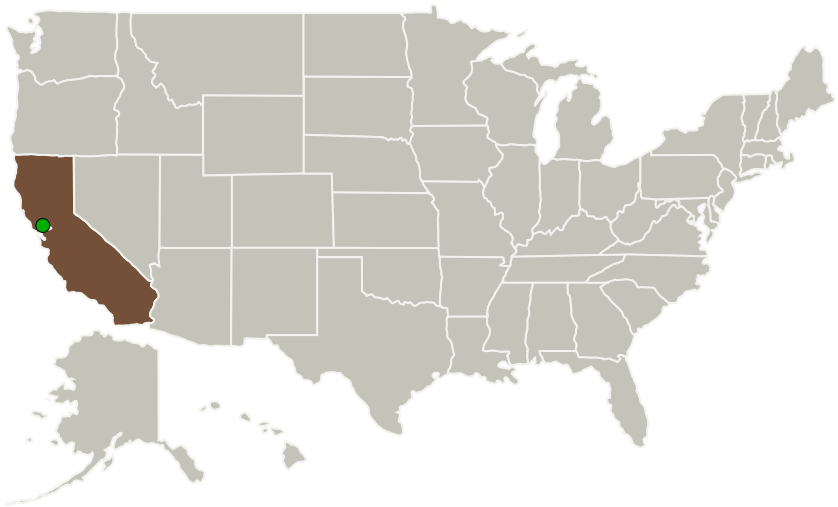
Hybrid High-Fidelity Auscultation Scope, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

To address the NASA Johnson Space Center's need for a space auscultation capability, Physical Optics Corporation proposes to develop a Hybrid High-Fidelity Auscultation Scope (AUSCU-SCOPE) based on a unique combination of multiple auscultation mechanisms with a novel sensor-fusion algorithm. This system incorporates a hybridized sensor configuration and novel signal processing algorithm that will separate low-intensity body sounds (<25 dBA) from a noisy background (>70 dBA) experienced in spaceflights with a 20-dB signal-to-noise ratio. The non-invasive and space-qualified AUSCU-SCOPE is safe, easy-to-use for a non-expert crew member and does not require extra training of clinicians to Doppler sounds. Additionally, the system easily connects with space telemetry systems via Ethernet, firewire, USB, and wireless 802.11 for transmitting sound data for distance diagnosis. In Phase I, POC will demonstrate feasibility of AUSCU-SCOPE through system design, simulation, assembly, and testing of a benchtop prototype, which will reach TRL-level 4 by the end of Phase I. In Phase II, POC will develop a fully functional prototype at TRL-6 and demonstrate high-fidelity spaceflight auscultation capability in the presence of a 70-dBA noise. The results will enable NASA to perform spaceflight auscultation even against significant background noise.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

February 2011: Project Start

August 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138613)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Physical Optics Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

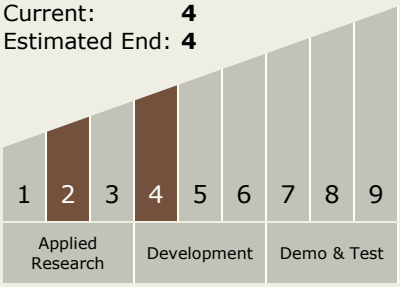
Carlos Torrez

Principal Investigator:

Ninad Patnekar

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.1 Medical Diagnosis and Prognosis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System